diately perceptible. After stating the methods for adjusting this thermometer for the measurement of the greatest heights, the author details some experiments upon altitudes made with an instrument, 552 parts upon the scale of which were equal to 530 feet in altitude. With this instrument boiled on the counter of a bookseller's shop in Paternoster-row, estimated between four and five feet above the foot pavement on the north side of St. Paul's Churchyard, and boiled again in the gilt gallery of the cathedral, there was a difference of 254 parts; the corrected height thus indicated therefore = 272·64 feet. General Roy makes the gallery above the north pavement to be 281 feet, which, allowing five feet for the difference of station, brings the author's estimate to 267 feet, differing only four feet; or by another calculation, founded on General Roy's statement, the difference is less than two feet.

Observations on the Analogy which subsists between the Calculus of Functions and other branches of Analysis. By Charles Babbage, *Esq. M.A. F.R.S.* Read April 17, 1817. [*Phil. Trans.* 1817, *p.* 197.]

At the commencement of this paper the author states the advantages which may be derived from the employment of analogical reasoning in mathematics, and recommends it as a very useful guide to new discoveries: he then proceeds to point out the striking resemblance which subsists between several parts of common algebra and the integral calculus, and similar parts of the calculus of functions.

Mr. Babbage then notices certain fractions which, by peculiar relations among the functions of which they consist, become evanescent. The true values of these fractions are ascertained, and they are applied to the solution of a class of functional equations which the author had solved in a former paper, from which the following result is obtained:—"Whenever the mode of solution there adopted seems to fail, the failure is *apparent* only, and the general solution may always be deduced from it."

Several points of resemblance between the integral calculus and that of functions, are then noticed; and a remarkable analogy between a method of integrating differential equations, and a mode of solving functional equations, is pointed out; in both cases the operations are performed by multiplying by a factor, whose form is to be determined by another equation. Some equations are given in which this method is successful, and the obstacles to its general application are pointed out as demanding further inquiry.

Of the Construction of Logarithmic Tables. By Thomas Knight, *Esq. Communicated by* Taylor Combe, *Esq. Sec. R.S.* Read February 27, 1817. [*Phil. Trans.* 1817, *p.* 217.]